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TECHNOLOGY DEPARTMENT

SCIENCE NEWS LETTER

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DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JULY 19, 1947



Absolute Silence

See Page 41

A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Scientists Best Defense

Leadership in science must take the place of military defense against atomic bombs. Research in medicine and biology is necessary, says board.

► "SCIENTIFIC leadership is the nation's best defense," a seven-man medical board of review has reported to the Atomic Energy Commission.

"The need for medical and biological research on the various effects of radioactive substances and atomic fission is both urgent and extensive," the report warns.

"It is urgent because of the extraordinary danger of exposing living creatures to radioactivity.

"It is urgent because effective defensive measures (in the military sense) against radiant energy are not yet known.

"From now on we shall mine, transport, process and use radioactive substances as sources of power, tools for investigation of biological processes, and for the treatment of disease. There will therefore be incessant danger in handling such substances and using their radioactive properties. The need for further research is extensive as well as urgent.

"As an explorer allows for unforeseen hardships and unpredictable events, the investigator must plan for extensively unforeseen eventualities. The number of radioactive substances is large; many have never been identified as existing in nature.

"Such substances call for suspicious study. The facts learned and the mastery obtained in the past four years acquire most of their immense significance not merely from their present state of development but from what they will lead to. As the sole possessor of the materials and the processes involved, the Atomic Energy Commission must continue and extend research for which it has the primary, and in the U. S. A. the sole responsibility.

"In terms of human life, this research must be based on medical and biological science."

Here are other highlights of the report:

For scientific supremacy we cannot depend on the memories of the men who worked together to produce the atom bomb and to protect the workers.

We must train oncoming groups of young men, year after year. The young scientists will replace present authorities

on 1. atom-splitting, 2. devising new ways of using atomic power in peace and war, and 3. searching for methods of protecting the workers and the civilian population.

Newly-discovered radioactive substances must be studied for their dangers and their possible disease-curing properties.

Steps should be taken to make isotopes, the chemicals produced by atom-splitting, available to foreign investigators.

The Atomic Energy Commission should cooperate with the U. S. Public Health Service and universities in research and in training young men to conduct it, so far as security permits.

Members of the board were: Dr. Robert F. Loeb, Columbia University, Chairman; Dr. Detlev W. Bronk, University of Pennsylvania, and Chairman, National Research Council; Dr. Wallace O. Fenn, University of Rochester School of Medicine and Dentistry; Dr. Herbert S. Gasser, Director, Rockefeller Institute for Medical Research; Dr. Ernest W. Goodpasture, Vanderbilt University; Dr. Alan Gregg, Director for Medical Sciences, Rockefeller Foundation; and Dr. A. Baird Hastings, Harvard Medical School.

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MEDICINE

Inhaling Amyl Nitrite Will Cure Hiccup Seige

► INHALING amyl nitrite, medicine which many heart disease patients carry with them, will cure hiccups, including the alcoholic variety, when all else fails.

Its use to cure hiccup of "unbelievable forcefulness" which lasted almost four days is reported by Dr. R. C. Nairn in *Lancet* (June 14).

The victim was a stoker on a small ship doing minesweeping off Malaya during the war. Dr. Nairn, then a lieutenant surgeon in the British Navy, first suggested all the old and well-tried methods, such as holding the breath, breathing in and out of a paper bag, pulling on the tongue, and eating or

drinking such things as sugar and eucalyptus oil or sugar and vinegar.

When none of these worked, the hiccuper was transferred to Dr. Nairn's ship for examination and further treatment. A mixture of oxygen and seven percent carbon dioxide was given by a special apparatus but did no good. A sleeping medicine and morphine and kaolin (a fine clay) were given, the latter to relieve any possible stomach irritation. The hiccuper fell asleep, still hiccupping.

He stopped hiccupping early in the morning, "much to everyone's relief," but half an hour after awaking and drinking a little fluid, the hiccupping started again.

Dr. Nairn was considering giving a general anesthetic, such as ether, or paralyzing the patient's phrenic nerve by injecting a local anesthetic (procaine).

"Before seriously contemplating these heroic procedures," Dr. Nairn reports, he made a mental survey of the drugs supplied to small ships. One anti-spasmodic had not yet been tried. This was amyl nitrite.

Inhaling the vapor from one ampule of this "worked like a charm." In less than a minute the hiccup stopped.

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PHYSICS

Glare-Reducing Headlamp

► AN AUTOMOBILE headlamp with its glare greatly reduced is the invention on which G. C. Singer of Brownsville, Texas, has received patent 2,423,525. Since direct rays from the luminous filament are responsible for most of the blinding glare in such lamps, he places directly before this, on the inside of the flat front surface, an opaque disk that is silvered on its inner side, to reflect back the direct rays. These strike mirror surfaces on other parts of the lamp's interior, and thus emerge bright, but diffused.

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PHYSICS

New Form of Bolometer

► FOR A NEW form of bolometer, extremely sensitive heat-detecting instrument, patent 2,423,476 has been issued to three physicists of the Polaroid Corporation, B. H. Billings, W. L. Hyde and E. E. Barr. Essential part of the instrument is a film of chromium and silver, deposited by evaporation on a very thin pellicle of nitrocellulose.

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NUCLEAR PHYSICS

Atomic Frontier Advanced

Cyclotron at Berkeley has knocked 22 and possibly 30 particles out of atomic nuclei. Over a hundred radioisotopes have been discovered.

► THE STUFFING literally has been knocked out of the atom, and the atomic research frontier has been advanced far beyond the knowledge from which the atomic bomb was fashioned.

Breathtaking results of ultra high frequency bombardments with the giant University of California cyclotron at Berkeley were disclosed for the first time to the Pacific coast section of the American Physical Society.

The 4,000-ton nuclear destroyer has knocked 22 and possibly as many as 30 particles out of the atomic heart or nucleus. A hundred or more new radioisotopes are in prospect, elements have been transmuted 16 steps down the periodic table and a host of new highly complex problems posed for scientists.

Research sponsored by Atomic Energy Commission as part of its peacetime program was reported by Drs. Glenn T. Seaborg and Isadore Perlman, who were aided by Drs. B. B. Cunningham, H. H. Hopkins, Manfred Lindner, D. R. Miller, P. R. O'Conner, and R. C. Thompson.

Two or three particles are the usual number knocked out by prewar cyclotrons. In sample bombardment, arsenic, which is element number 75, was transmuted down to cobalt 54. When results can be studied more closely, the scientists may find 30 particles dislodged.

New Radioisotope Series

An entirely new series of one hundred or more radioisotopes of common elements which are lighter than stable isotopes is opened up by these bombardments. This is a greater number than resulted from the fission in the atomic bomb, which produced mostly isotopes heavier than the stable isotope of elements. In fission, nuclei are overbalanced with neutrons and such nuclei tend to decay up from the stable isotope. Iodine fission isotopes included iodine 131 and higher, while stable iodine is 127.

Few lighter isotopes were produced before ultra high frequency bombardments, which create transmutation products tending to be overbalanced with protons after removal of many neutrons.

Such nuclei stabilize by converting protons into neutrons and in losing charge decay downward. For example: a new light isotope is iron 52 produced from the bombardment of copper. Previously no isotope of iron lighter than the stable isotope 54 had been produced.

Drs. Seaborg and Perlman said that many new isotopes useful for tracers for uses not now existing may now result.

As many as 30 different radioisotopes were created in one bombardment, some new, some familiar. Different rates of decay make identification highly complex.

In one case arsenic bombarded by alpha particles or helium hearts produced chlorine, 16 steps down the periodic table. Prewar cyclotrons transmuted elements up or down one or two elements.

With simpler patterns of lower energy range, transmutation routes almost always can be predicted. But the new leap down the periodic table opens up alternative routes, primarily because several charged particles are knocked out. Scientists must now set to work on a new set of principles to predict new phenomena.

The fission of uranium with deuterons and alphas was also reported. This resulted in wider spread of fission products than with slow neutrons, and more symmetrical splitting with fission products bunched in center of periodic table.

Cloud chamber photos made by Dr. Wilson M. Powell of nuclei disintegrating under impact of 100,000,000 electron volt neutrons from cyclotron were also shown. Five-pointed stars resulted, similar to cosmic ray phenomena. These stars represent most complete man-made disintegration of atom ever achieved.

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EDUCATION

Chemist To Head UNESCO Science Regional Offices

► AN AUSTRALIAN chemical engineer who was born in Memphis, Tenn., will supervise the three science cooperation offices of UNESCO being set up this year in Rio de Janeiro, Cairo and China.



TIMING CAMERAS—Electrically operated, this camera that timed the speed-champion Lockheed P-80R is accurate to 1/1000 of a second.

He is William E. Purnell of Sydney, who has specialized in rubber chemistry.

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GENERAL SCIENCE

Six American Scientists Join MacArthur's Staff

► THE NAMES of six leading American scientists who just departed for Japan have been revealed by the War Department. They went as expert advisors to General MacArthur's staff.

They will spend a month in that country, under the sponsorship of the National Academy of Sciences, evaluating plans submitted by Japanese scientific bodies for the democratization of scientific research in Japan. Each will report in his own field to the Economic and Scientific Section of the Army staff in Tokyo.

The members of the group are Dr. Roger Adams, head of the chemistry department of the University of Illinois; Dr. Merrill Kelley Bennett of Food Research Institute, Leland Stanford University; Dr. William D. Coolidge, director emeritus of research, General Electric Company; Dr. William V. Houston, president of Rice Institute; Dr. William J. Robbins of New York Botanical Garden; and Dr. Royal W. Sorensen, electrical engineer, California Institute of Technology.

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MEDICINE

Radioactive Germs Made

Radioactive penicillin is also being prepared to trace bacterial action in the body. Material must be flown to laboratories because of short life.

► RADIOACTIVE disease germs and radio-active penicillin, the mold chemical that stops many of them, are being created in the National Institute of Health laboratories of the U. S. Public Health Service in Washington.

This is one reason for the flying atoms which, along with flying saucers, have been worrying airline pilots lately. The radioactive chemicals are being flown to Washington and to other laboratories from the atom bomb pile at Oak Ridge, Tenn., where they are made. The short half-lives of the radioactive chemicals require speedy transportation.

Atoms of radioactive phosphorus, potassium and other chemicals, however, are securely sealed in containers which will not let any of them escape *en route*, Atomic Energy Commission officials declared.

They delivered the thousandth shipment from Oak Ridge to Dr. Kenneth M. Endicott, U. S. Public Health Service. Except for the fact that it was the thousandth shipment from Oak Ridge, its arrival would have been part of routine operations for American Airlines' Knoxville to Washington flight. Other airlines operating out of Knoxville (Capital and Delta) have also been flying shipments of radioactive chemicals.

The radioactive germs and penicillin are being prepared so that scientists can trace both germs and their mold chem-

ical enemy through the body. How the body's own germ-fighting forces, technically termed immune mechanisms, act is one problem that may be solved through these studies.

The radioactive penicillin will go to the Public Health Service's venereal disease laboratory at the Staten Island Marine Hospital where penicillin was first discovered to be a remedy for syphilis. Radiopenicillin was produced by putting radiosulfur into the material on which the penicillin-producing mold is grown. It will not be used to treat disease but to give further information on how much penicillin is in the blood, how fast it is excreted from the body, whether some organs store more than others, and similar facts.

Knowledge of this sort, needed to determine proper dosages, has so far been gained from chemical methods that took much time to work out. With radiopenicillin and the possibility of making streptomycin and other antibiotics radioactive, scientists hope to gain such knowledge much more quickly in the future.

Radioactive potassium gives engineers a new tool for checking ventilation. It is being used at the National Institute of Health to check the ventilating system which is the main defense of men and women working with dangerous disease germs in the new infectious disease building.

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MEDICINE

Streptomycin for Plague

► STREPTOMYCIN and DDT, two of modern medicine's most powerful disease fighters, may help stop the outbreak of plague in Palestine, reported "definitely alarming" medical authorities there.

Plague victims are already getting streptomycin, if latest medical reports on this chemical from a mold have reached Palestine physicians. That report, said Dr. Karl Meyer, University of California epidemiologist, showed that streptomycin controlled pneumonic plague in 90% of mice.

"There is every reason to believe streptomycin will be equally effective in man if given early in the attack of plague," he stated.

Pneumonic plague is the most deadly form of the disease. It is caused by the same germs, however, as the bubonic plague reported in Palestine. And streptomycin stops the germs.

Substantial amounts of streptomycin have been exported to Palestine every month, license applications at the Office of International Trade show. So doctors there will be able to use it.

Plague germs are carried from rats to man or from human patients to other humans by fleas. DDT will kill the fleas, just as it killed lice to stop the typhus fever epidemic in Naples when our troops first occupied that city during the war.

Killing the rats, standard plague-fighting procedure, will be more easily and effectively accomplished by two potent rat-killers developed during the war. These are Antu and 1080. The latter is used only by professional rat-killers. The former can be used by householders.

Before the discovery of streptomycin, sulfadiazine was used to check plague in China.

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SCIENCE SERVICE

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ENGINEERING

Engineers Need Biology

To prevent harm to waterways and soil, engineers should know more ecology. Lack of knowledge leads to harm.

► ENGINEERS generally have little or no knowledge of biology, and this gap in their education often causes them to do harmful things unwittingly, declares Dr. Paul B. Sears, professor of botany at Oberlin College and author of *Deserts on the March* and other books on conservation.

In *Science* (July 4) Dr. Sears points out some of the ill effects of engineering works that might be avoided if engineers had more knowledge of living things and the soils and waters in which they live.

Engineers, networking the country with highways, are interested in water only to get rid of it as rapidly as possible. This, declares Dr. Sears, "accelerates movement of water into main drainage channels in flood time and interferes with maintenance of ground-water level by removing water before it can soak in. Also, by speeding the movement of water in earth channels, it leads to roadside erosion and consequent lateral gullies into agricultural land."

Industrial engineers may do an excellent job in building wealth-creating factories, but when they arrange for dis-

charge of wastes into rivers they destroy wealth that is already there. One industrial plant, cited as an example, killed more than 200,000 fish in one summer month by pouring its toxic wastes into the Miami River.

Stream control, which is likely to be a very lively subject after this summer's disastrous floods, needs the broadest ecological approach to be really effective. This has been done in such places as the Tennessee valley. Yet the planners of a \$20,000,000 dam in 1935 rejected the services of ecologists, with the consequence that in a few years they were having to fight flood damage, and found their reservoir to be rapidly filling up with silt.

Present engineering-school curricula have no place for basic courses in ecology, which is the sociology of plant and animal life, and the sciences that deal with soils and natural waters. It is hard to see how such studies could be squeezed into the tightly packed schedules in today's highly standardized engineering courses. Yet without this knowledge, engineers will continue to do unintentional evil along with their good works.

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DR. CALDWELL—The death of Dr. Otis W. Caldwell means a loss to science and education.

Though we then lived in a county seat town, the nearest public library was thirty miles away. Even the best public library didn't possess much of the best reading material. Not much then existed, as compared with what may be had today.

The scope and nature of American education has changed. Everybody may now have an education provided he has a little of the necessary gray matter. We even waste a lot of educational time trying to educate a minority who do not possess the "makings," because a little education has become the shibboleth of social respectability. Anyway, our American education has produced millions of high school, college and university graduates, nearly all of whom can benefit through use of modern reading material. Educated men and women in all walks of life constitute a new reading public. It is new in size and new in the scope of its interests.

No aspect of human learning is more important than science. Its astonishing new knowledge appeals to almost everyone. The benefits to humans are hard to measure but are very great. And probably most important of all, the ways of working of scientists seem likely to affect thinking and action of people in general.

People understand much of our science these days. Atomic energy means something to most readers even though parts of it are yet unknown to those who know most. If those who write and who

EDUCATION

Progress—Read to Learn

The death of Dr. Otis W. Caldwell on June 5 has ended a notable career in science and education. Dr. Caldwell was a leading biologist and for ten years head of the Lincoln Experimental School of Columbia University Teachers College. He was a powerful force in the new mode of education in this country.

At the time of the annual meeting of Science Service, Dr. Caldwell, who was a trustee of Science Service, nominated by the American Association for the Advancement of Science, prepared for delivery over the CBS network an evaluation of the public's uses of printed pages about science. Because of illness Dr. Caldwell was not able to deliver this on the radio and SCIENCE NEWS LETTER now publishes it as a final message from Dr. Caldwell.

► DURING my three-quarters of a century a lot of things have happened to the reading public. In our childhood we were constantly urged to *learn to read*. Ever since those childhood days we have been *reading to learn*. Indeed no child has made much progress until his emphasis on learning to read has shifted to reading to learn. Each one of us should always be improving his reading habits, and many adults constantly do so. Reading with enjoyment, understanding, and growth in culture has become a major interest of millions of people.

I well remember when my reading was restricted to "The Youth's Companion," "The Herald and Presbyter," the Sunday school leaflet, a weekly newspaper and an occasionally borrowed volume of Dickens or other novelist.

Speak will always be as clear as they can be, plenty of folks will understand. New words are not a bother whenever new ideas are reused as the vital things for which new words exist.

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OCEANOGRAPHY

Longest Mountain Range To Be Explored by Boat

► THE WORLD'S longest mountain range, that extends almost from pole to pole, is about to be systematically explored for the first time—and by boat. Thus far, men have had knowledge of its existence, but no one has actually seen more than its highest peaks.

This range is almost wholly under water, very close to midline of the Atlantic ocean; it is known as the Atlantic ridge. Top peaks are such islands as the Azores and Ascension.

The exploration will be conducted by an expedition in the research ship *Atlantis*, owned by the Oceanographic Institution of Woods Hole. Prime objective is to learn whether there are deep, eroded canyons in the flanks of the ridge. The expedition will also endeavor to learn the depth of its covering mantle of silt and obtain samples of this bottom material.

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MUD-DIGGING—To trap samples of ocean mud, this 10-foot long steel tube (behind middle man) is dropped over the side of the ship and plummets into the ocean bed through the pressure of an 850-pound lead weight (between middle and right men). A cross-section of sediment fills the tube, which then is hoisted to the deck.

NUTRITION

World Must Double Food

International cooperation is necessary and possible, states one of leading authorities on the world food problem. Prices must be stabilized.

► WORLD FOOD production will have to be doubled within the next 25 years, declared Sir John Boyd Orr, director-general of the Food and Agriculture Organization of the United Nations. It looks like a large order, but it can and will be done, he predicted.

Sir John, who is one of the world's foremost agricultural economists, spoke as the guest of Watson Davis, director of Science Service, on *Adventures in Science* over the Columbia Broadcasting System.

The alternative to bringing everybody in the world up to the American level of nutrition is not pleasant to contemplate, Sir John asserted: "Two world wars and a world depression are just a mild shake-up compared with what we are in for unless we can solve the fundamental problems of industry, agriculture and trade on a world scale."

The speaker was confident that a program of international cooperation to increase food supplies is possible even though international action in certain other fields has been having its difficulties. For one thing, he pointed out,

this program will be based on facts and not on theories, and it is in the interest of everyone to see it succeed.

Preparations for such a program have already been started, and will be the subject of a conference of the FAO at Geneva next month.

Sir John outlined the steps that will be recommended:

"A Preparatory Commission of 17 nations was set up some months ago to study long-term world food proposals made by FAO last summer. Their report makes strong recommendations for a world-wide agricultural and industrial development program such as we have been discussing, plus international commodity arrangements to stabilize the prices of major agricultural products in the world market.

"That latter provision is intended both to protect consumers from too high prices in a period of shortage and to safeguard producers in a period of so-called surplus by helping to prevent the kind of slump that ruined agriculture between the two world wars. Under these proposals, reserves of certain foodstuffs would be built up to prevent famine and to be used in other ways to meet human needs, and farmers in the high producing countries would have an assured market at steady prices.

"The whole program would be under the general guidance of an advisory body to be known as the World Food Council, or Council of the Food and Agricultural Organization, which would keep an eye pretty continuously on the world food situation and be prepared to meet problems as they arose. The actual operation of the program would be up to the individual governments—but the machinery would be provided through which they could work constantly together."

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"Distillers feeds" are grain-yeast feeds resulting from the processing of grain by a distillery; in the production of spirits from grain only the starch is removed, with the proteins, fats and minerals remaining, further enriched by yeast used in the fermentation.

AERONAUTICS-MEDICINE

Aid for Crash Survivors

Rescue crews will be on call at all times to rush to victims of plane crashes. Food, water, plasma and other necessities will be dropped.

► CIVILIAN survivors of airplane crashes soon may have prompt and expert aid by plane and parachute. Rescue crews, organized and operated by the Army Air Forces for military purposes, will be in alert status at all times, ready to rush by air to a crash. They will be available for civilian crashes upon request.

The plans being worked out by the Army Air Forces are based in part on recent experiences in rescuing survivors of an Army plane crash in Nicaragua. Prompt action by Army officers is responsible for saving 13 lives that otherwise might have been lost, out of a total of 15 involved. More prompt arrival of medical aid might have saved one more. One man was never found.

Under the plan, it is expected that several rescue crews including paratroopers will be stationed at widely separated Army airports within the United States. There will be two in Alaska, one or two in Hawaii, two in the Caribbean area, and others elsewhere in distant lands.

Each crew will include a "paradoctor." This is an Army physician trained in parachuting. When he drops to a survivor he will carry with him the essentials for first aid. Special medical kits, each with its own parachute, will be dropped at the same time. They will contain medical supplies, plasma, water, food, vermin repellents and other essentials, including a machete to clear out brush for a helicopter landing or a pathway for carrying injured to other conveyances.

Each crew will contain two trained surgical technicians and two "survival experts." These are soldiers trained to combat the particular conditions in the area of the crash. They will be jungle troopers for jungle areas, and "Arctics" for northern Alaska.

At each station a crew will be ready at all times to take off immediately after call. Disassembled helicopters already loaded on cargo planes will be ready to follow, or the crew may travel in the plane with the helicopter. These will be landed at the nearest airstrip to the crash, and can be made ready for the air in a few hours.

In the Nicaragua mission, a Fairchild Packet (Army C-82) took off from Morrison Field, Florida, with helicopter aboard. Delay in take-off was encountered because the only Army paradoctor stationed in the United States was at Westover Field, Massachusetts. The plane landed on Managua airport, near the west coast of Nicaragua. There the helicopter was unloaded, assembled, and took off to Alimicambi, the airstrip nearest to the search area.

It was five days after the crash when Capt. Pope B. Holliday of the U. S. Medical Corps, the mission's paradoctor, reached the first survivor by parachute. Under the new plan, with rescue planes and crews always in readiness, survivors should be reached in hours, not days.

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ENGINEERING

Two Fastest Submarines To Be Completed in '51

► TWO NEW American submarines, scheduled to be completed in 1951, will be the world's fastest underwater combat boats, the U. S. Navy revealed today. Construction has just been authorized by Congress.

They will be named the Tang and the Trigger, being successors of famous sub-

marines of the same names, (both lost in 1945), that took a heavy toll of Japanese shipping. The Tang will be built at the naval shipyard at Portsmouth, N. H., the other at an unannounced private yard.

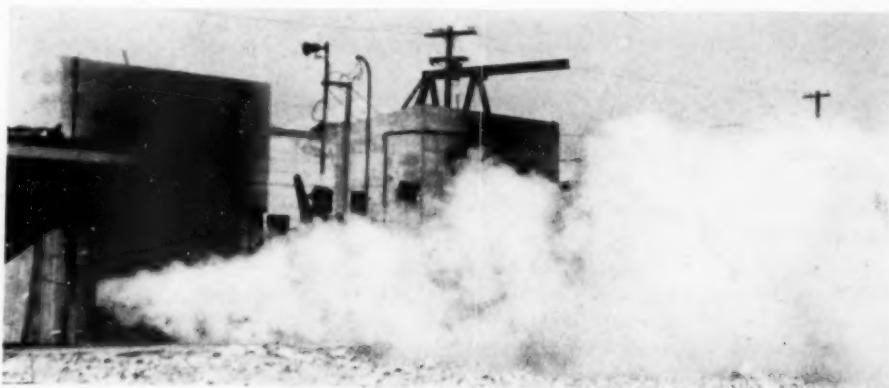
Hull, machinery and contract plans are being prepared by the Navy Bureau of Ships. All desirable enemy and Allied wartime developments will be included in their design. Final detail features, however, will not be fixed until near the end of their construction so that developments perfected during the next few years can be included.

They will be speedy and comfortable for crews and will have radical departures from conventional hull and machinery design. These are the only details announced. However, it is known that the U. S. Navy has two captured German U-boats in American waters for testing and evaluating, and much information about others.

Germany, during the war, developed submarines far superior in some respects to Allied underwater craft. The "snorkel" system was one of their most important achievements. It includes a breathing tube that can be used when the U-boat is relatively near the surface, but still well hidden under the water. Snorkel-equipped submarines are known to have remained submerged up to 70 days.

Another important German development was a streamlined hull to take full advantage of increased battery power. The Allies captured designs of a U-boat which would have an under-water speed of 24 knots, which is more than present American submarines can make on the surface. It was to be propelled with hydrogen-peroxide gas turbine engines.

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JATO—These rocket-like shells are attached beneath heavily loaded aircraft to provide additional thrust to get planes into the air in short spaces. The wartime secret of JATO fuel has been revealed: it is a black plastic mixture of a special type of asphalt, a light oil and a chemical oxidizing agent.

PHYSICS

Aluminum-Coated Mirror Aids Optical Instruments

► OPTICAL instruments using reflectors, such as some telescopes, will produce clearer images by use of new aluminum-coated glass mirrors with the metal on the front face. There are many other uses for the new reflector.

This new mirror has just been revealed by Libbey-Owens-Ford Glass Co. It is now in production by the Liberty Mirror division of the company. It is designed particularly for use in a long line of scientific equipment ranging from submarine periscopes to television receivers.

Putting the reflecting aluminum coating on the front surface of the glass assures a single reflection. When the coating is on the rear, as in ordinary mirrors, there is a double reflection: a bright one from the coated rear surface, and a dim one from the front surface of the glass itself. In conventional uses, the double reflection is harmless; in scientific instruments, it gives a slight undesirable blur.

In the manufacturing process employed in making the new mirrors, a method called thermal evaporation, a coating of hard quartz is deposited on the aluminum to insure durability. The film is found to withstand extreme temperatures from minus 60 degrees Fahrenheit up to 200 degrees. It is resistant to moisture and salt atmosphere.

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ETHNOLOGY

Aymara Indians of Andes Are Worst of Worriers

► THE WORLD'S worst worriers are the Aymara Indians, who live on a 14,000-foot-high plateau in the Andes, near Lake Titicaca. Some of their fretful customs are described by Harry Tschopik, Jr., anthropologist of the American Museum of Natural History, who has just returned with his wife, an archaeologist, after living in one of their villages for seven years.

Life is hard in the bleak, barren, wind-swept Aymara country, and their hardships seem to be reflected in the mental attitude of the people. They "appear not to like anybody, including each other." They worry constantly about the immediate future, and try to learn by divination the outcome of such commonplace things as going to market or raising potatoes. When a person dies, he gets

"blamed" for becoming a permanent absentee from his work. Children are coddled and petted until they are about three years old, but then are considered ready for such jobs as herding pigs.

Witchcraft is very common, both the black and white varieties. A woman of the village hired a professional black witch to "put a hex" on the Tschopiks. Both became ill shortly thereafter, which was of course credited to the witch's magic powers by the Aymara, who subjected them to a strict boycott. To make it possible to continue working there, the Tschopiks had to hire a white witch and go through a tedious "de-hexing" ceremony. Then the woman who had started the trouble lost face and left town.

About the only fun the Aymara ever get seems to be from drinking "tinka" at funerals and on holidays. Formula for tinka: one quart alcohol, one quart water, one handful coca leaves (source of cocaine), one handful cigarette butts. Taken straight, without chaser.

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ASTRONOMY

Poland Receives Gift Telescope from Harvard

► A FAMOUS Harvard telescope that has photographed over 100,000 stars has arrived in Poland as a Harvard gift, to become the chief instrument of a new observatory at the birthplace of Copernicus, famous astronomical pioneer.

Dr. Harlow Shapley, director of Harvard College Observatory, announced that the famous eight-inch Draper telescope has been received in Torun, Poland, by Prof. S. Dziewulski, leading Polish astrophysicist.

A major step in restoring Polish observatories destroyed by war, the Draper photographic doublet instrument was specially rehabilitated and equipped for an important program of Polish research on star colors, temperatures and chemical compositions.

The telescope will be the nucleus of the new Copernicus observatory at Torun, where Nicholas Copernicus was born. Copernicus is the astronomer whose theory put forth in 1543 placed the sun and not the earth at the center of the system of planets.

At Harvard the Draper telescope provided spectrograms of 100,000 northern stars for the late Annie Jump Cannon's famous ten-volume Draper catalog of spectral classes, positions and brightness.

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IN SCIENCE

AGRICULTURE

Floods Killed Ragweed With Corn Destruction

► FLOODWATERS that ruined millions of acres of lowland corn did at least one good thing along with all the evil they wrought. They also killed millions of acres of ragweed, whose pollen is the chief cause of hayfever in this country.

Tall ragweed flourishes best on muddy riversides subject to frequent flooding that prevents more permanent types of vegetation from getting a foothold. It also grows densely on the neglected patches of land in odd corners of railroad yards, around city dumps and on low-lying wasteland generally. Low ragweed is a dominant cornfield weed, along with cocklebur, which is perhaps the No. 3 hayfever pollen producer over most of the Midwest.

Along with the lowland cornfields, the wasteland habitats of the ragweeds have been drowned out, sometimes being under water continuously for weeks. Like the lowland corn, the lowland ragweeds have been either killed outright or so retarded in their growth that they will hardly blossom and produce pollen this summer.

This destruction of hayfever weeds on the lowlands will be at least partly offset by their greater growth in upland cornfields where continuous rain prevented effective cultivation during the spring weeks. Now this corn is too high to cultivate and the ill weeds grow apace.

Just what the final balance sheet of ragweed acreages will be there is no way of guessing now. It should be interesting, however, to compare this year's daily pollen counts with those of more nearly normal years.

The weedy cornfields will, of course, produce huge crops of ragweed seed and cockleburs to plague farmers and folk with sensitive noses next year and for several years thereafter—for part of the seeds of these troublemakers always lies dormant for from one to five years. By the same token, the riverside areas that bear no ragweed crops this year will have them in 1948, from the dormant seed now lurking in the soaked soil.

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SCIENCE FIELDS

ENGINEERING

Automatic Refrigeration Process Uses Ammonia

► A HOUSEHOLD refrigerator using calcium chloride, ammonia and heating gas, developed in Germany and said to be relatively inexpensive and satisfactory, was revealed by the U. S. Department of Commerce.

The liquid ammonia is the refrigerant. It passes within the cabinet through an evaporator where it is turned into a gas by the heat from the food in the box. It then goes through cells of solid calcium chloride where it is picked up by the chemical and condensed into a liquid again. The heat given up is removed by a mechanical blower.

The gas heat is used whenever the calcium chloride becomes saturated with the ammonia. It is turned on and off automatically. The heat vaporizes the ammonia and forces it into a condenser where it becomes a liquid to start anew through its circuit. The whole operation is automatic. No time switches are needed to control heating or other action.

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MEDICINE

Big Molecules May Cause Hardening of Arteries

► A NEW IDEA of the cause of high blood pressure and hardening of the arteries, one of the major causes of death, is suggested by a report from four South African scientists to *Nature* (June 28).

Big, inert molecules that flood the blood circulation might be the cause. They might be molecules of protein or of sugars or of a combination of fat and protein.

Africans with pellagra started this idea in the minds of Drs. J. Gillman, T. Gillman, J. Mandelstam and C. Gilbert of the University of the Witwatersrand at Johannesburg.

These Africans and others who were not suffering from pellagra developed a condition called cytosiderosis. Large quantities of iron pigment were deposited in their livers. Big, inert molecules which could be traced because of their iron content, were found to leave the liver in the bile. They were then absorbed by

the intestines and spread by the blood circulation.

The flooding of the circulation with these big molecules can result in a number of "extraordinary" reactions, the doctors found. Among these is hardening of the arteries.

The Johannesburg scientists are now trying to learn whether big molecules play a similar role in hardening the arteries of persons who do not have the pellagra and cytosiderosis in which the role of big, iron-containing molecules was discovered.

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PROSTHETICS

VA Exhibits Artificial Parts of Body for Use

► AN EXHIBIT of spare parts for the human body, to be used something like a sample showroom or library, was opened in Washington by the Veterans Administration this week.

A "reference exhibit of prosthetic devices" is the technical name for it. It will be permanent and is the only one of its kind in the world.

Here is how it will work:

Someone needs a spare part. It might be a leg or an eye or even hair for the head. He or his doctor, by consulting this reference exhibit, can find the one best suited to his needs. If he is a veteran, he can get the device through VA's "free choice of appliances" policy. If he is not a veteran, he gets it by an order to some private firm that makes it. By consulting the reference exhibit, he will be spared the trouble and sometimes disappointment of shopping around from one firm to another to find the best device for him.

Manufacturers also will use the reference exhibit to aid them in producing new or better devices.

Artificial arms, legs, hearing aids, aids for the blind, plastic eyes, wigs, cosmetic hands, spare parts for the face, wheel chairs, crutches and canes are among the 1,000 items, more or less, in the exhibit.

It took more than a year to assemble the exhibit. Members of the prosthetic appliance industry aided by contributing 95% of the items at no expense to the Government.

Experimental models, as well as those now in manufacture, are included. These are not available to veterans, though some may become available when they get past the experimental stage.

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ACOUSTICS

Even Heartbeat Disturbs Soundproof Room's Silence

See Front Cover

► THE QUIETEST place on earth may be the ultra-soundproof room shown on the cover of this *SCIENCE NEWS LETTER*. Even a heartbeat breaks the silence. It was constructed by Bell Telephone Laboratories, Murray Hill, N. J., for acoustical research.

Walls, ceiling and sub-floor are lined with saw-tooth wedges of fiberglass to a depth of five feet. The working floor resembles the hitting surface of a tennis racket. It is made of high-strength steel cables only eight-hundredths of an inch thick, strung under high tension in two-inch mesh from the walls. The netting can support tons of equipment.

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SOIL CONSERVATION

Raindrop Splashing Starts Cycle of Soil Erosion

► FLOOD DAMAGE, though measured in terms of hundreds of millions of dollars, is by no means the only harm that the diluvial "forty days and forty nights" of rain wrought in the Midwest. Upland fields escaped inundation, but enlargement of old gullies and opening of new ones are obvious evidences of the terrible toll taken by water erosion.

Gullies are the final, catastrophic stage in the erosion cycle. Its beginning comes with the fall of the first raindrop on unprotected soil. Studies by W. D. Ellison, hydraulic engineer of the U. S. Soil Conservation Service, show that first stage in water damage to naked soil comes with the innocent-looking splashing of raindrops.

A raindrop is a triple enemy of bare soil. It is a plunging projectile that knocks soil particles loose. It is a solvent for plant-nourishing elements. It is a means of separating fine silts from heavier sand-grains, and humus from mineral particles in the soil's complex structure.

There is a special word for that latter process, that deserves to become as familiar a warning-sign as the word erosion. It is slightly longer, but easy to pronounce: elutriation. Soil subjected to elutriation by raindrop splashing loses value "in place", as contrasted with the damage due to erosion, which involves the actual removal of the soil. There is much elutriated soil in the Midwest this summer.

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BOTANY

Poisoning Poison Ivy

2,4-D and ammonium sulfamate sprays, easy to apply, rout the burning, blistering pest. Vine can be recognized by its many aerial clinging roots.

By DR. FRANK THONE

► POISON IVY, poison oak and poison sumac, that evil triad that for generations has inflicted misery on millions, have reached the end of their trail. Man, long their victim, now confronts them as a victor. Their eradication, long considered practically impossible, can now be accomplished almost as by waving a wand.

The wand in reality is the nozzle of a sprayer, and its magic is the beneficent magic of chemistry. Whole communities are joyously joining in the attack, routing these ill weeds out of home plantings and parks, off school and playground walls, away from summer camps and hiking trails. There is no longer any excuse for letting these nuisances survive in any place frequented by human beings.

Principal weapons in this war against these poisonous tyrants are 2,4-D and ammonium sulfamate. Both are wartime developments, and became available in quantity to the public only this year. Both are offered under a variety of trade names; but somewhere on the label their content of the essential killing ingredients will be stated.

They are easy to mix and easy to apply. All kinds of sprayers will serve. Depending on the size of the job, they may range from the hand-wielded garden variety to power-driven outfits used for fighting insects in orchards. Some commercial eradicators have introduced fog-machines, which are adaptations of the smoke-machines of wartime fame.

Appearance of Enemy

But before we attack the enemy we must know what he looks like and where he is. Poison ivy and poison oak are for present purposes the same thing: vines or low shrubs with three-parted compound leaves, clusters of inconspicuous greenish flowers in early summer, and soiled-looking white berries in fall and winter. Actually, the plants are all of vine form; what appear to be clustered shrubs are really straight-up branches of a vine-like runner just under the surface of the ground. Where

conditions are right for this runner to turn up and climb a tree or a wall with its myriad clinging aerial roots, the branches stick out sidewise.

Poison sumac looks pretty much like ordinary sumac, except that its fruits are pallid berries like those of poison ivy. It is found only in the wet, acid soil around the margins of bogs. Unless you have occasion to go into such places, there is little likelihood of your running into poison sumac.

Others Found Everywhere

But its evil three-leaved cousins get around practically everywhere. By common consent the species that grows on the Pacific Coast is called poison oak, while the highly variable forms found in the East are lumped together as poison ivy. The "Eastern" poison ivy, however, is not strictly Eastern; its range pushes far to the northwest and in Oregon overlaps that of the coastal poison oak. While no part of the country is entirely free of one or another of these three-leaved pests, poison ivy reaches its greatest abundance along the Atlantic seaboard, thinning out and hugging the ground more in the drier parts of the country.

Now that we have identified and located the enemy, we may proceed with our chemical bombardment. First, a word about our two types of munitions. Each has its advantages, and each its drawbacks. A common advantage is that both are good killers. They can be too good killers if handled carelessly, for they are as deadly to tomatoes or beans or dahlias or rosebuds as they are to poison ivy and other weeds. So you must be careful not to spray where you don't want to kill. While 2,4-D has the peculiar property of harming broad-leaved plants but not grass, ammonium sulfamate is a grass-killer as well.

Ammonium Sulfamate

Biggest advantage of ammonium sulfamate is its quickness; poison ivy is dead within 48 hours after spraying, whereas after 2,4-D treatment the leaves remain green (and poisonous!) for two or three weeks. On the score of cost,

however, 2,4-D has the better of the argument. A gallon of 2,4-D spray solution costs only one or two cents, whereas at present prices a gallon of ammonium sulfamate solution costs about 20 cents.

The form of ammonium sulfamate that was available last year caused some complaint because of its tendency to corrode metals, and hence damage spraying equipment. This has been corrected, in the compound now offered by du Pont under the trade-name "Ammate."

Balancing advantages and drawbacks of both weapons, L. W. Kephart, in charge of weed investigation for the U. S. Department of Agriculture, states, "For treating small areas, where expense is not a factor, I still prefer Ammate."

Of the several compounds of 2,4-D on the market, Mr. Kephart recommends the ester, because it is prepared in oil and is thus sprayed as an emulsion that sticks to the leaves even if rain does come a few hours after spraying. If you can be reasonably sure of fair weather for a while after spraying, however, the sodium and ammonium salts of 2,4-D will be satisfactory.

Spray in Sun

Best time to spray, whatever you are using, is on a warm, sunny day, preferably in the forenoon. That is when life processes in plants are going at top speed, which will result in the more rapid absorption of the poison spray, and its distribution throughout the tissues, even down into the roots. It is best if you can have a day that is windless as well as warm, for that will decrease the risk of the spray being carried onto the leaves of plants you don't want to kill.

If a poison ivy vine has climbed into a tree, you don't need to injure the tree by spraying its leaves while you are after the invader's. Just chop off the vine close to the ground. Presently it will start new shoots; then you can spray them and thus kill the root.

While one spraying will devastate a patch of poison oak or poison ivy, you can't expect a hundred-per-cent kill. There will be a few survivors, as there are after any kind of massacre. Also, there are likely to be seeds in the ground, that will keep on coming up for several years. So you will have to go over the area twice or thrice the first season, and make seasonal check-ups thereafter.

After you have got all your spraying done, be sure that your sprayer is very thoroughly cleaned. Remember, both types of ivy-killer will kill other plants, too, and if you leave a little 2,4-D or Ammate lurking in it when you want to use the sprayer for DDT-ing the insects on your vegetables or flowers—well, it will be just too bad.

When you remove the overalls or old clothes you have been wearing while among the poison vines, drop them, and whatever else you have on, into a tub and soak them well in strong suds. Wash your shoes, your leather gloves. And finally, wash yourself. Go over yourself with strong brown GI laundry soap, or its equivalent, for the first-over. Strong soap kills the poisonous oil with which you have unintentionally besmeared yourself while wading in the weeds. Mild soap won't do it. Remember, you have been dealing in poison, so you are "unclean" until you have thoroughly purged your skin and your clothes of it.

After that, you can revisit the scene of your late combat, prepared to do some highly enjoyable gloating.

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CLINGING VINE—Poison ivy climbing on trees and walls can be surely identified by the innumerable clinging aerial roots. Harmless ivies have similar roots, but their growth is far less abundant.

PSYCHIATRY

Psychiatry for Faithful

Science of helping people solve their problems is a medical specialty and does not undermine religion. Psychiatry's aim is to relieve human suffering.

► **PSYCHIATRY** is not undermining religious faith and morals. This is the considered opinion of America's leading psychiatrists, among them prominent Catholics.

More than a hundred psychiatrists, including psychoanalysts, meeting in Minneapolis as the Group for the Advancement of Psychiatry, are greatly disturbed by the current attacks on psychiatry. The attacks, they believe, reveal ignorance of the real aims and principles of psychiatry.

Four of the most prominent Catholic psychiatrists in the United States took issue specifically with "the recent series of public statements attacking psychiatry attributed to Monsignor Fulton J. Sheen of the Catholic University of America."

These psychiatrists are Drs. Edward A. Strecker of Philadelphia, Leo Bartemeier of Detroit, Frank J. Curran of New York and Francis J. Gerty of Chicago.

"It is a fundamental tenet of the Cath-

olic Church," they stated, "that there can be no conflict between true science and religion. We wish to state our emphatic agreement with this principle."

They point out that psychiatry is a recognized medical specialty occupying the same position as surgery or any other specialty concerned with the relief of human suffering. The Catholic Church has supported and sponsored the teaching of psychiatry at the Catholic University of America, at the Church's five medical schools and in its numerous hospitals. At the present time a number of Catholic priests who are physicians are being trained in psychiatry with the approval of the Catholic Church.

Contrary to the charge that psychiatry undermines morals, Dr. Bartemeier pointed out that psychiatrists recognize that for some patients, their improvement depends on strengthening their consciences.

The psychiatrist does not judge or censure his patients, saying, "you are

good or bad," but helps his patients to see and understand themselves as they really are in relation to their situation in life.

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MEDICINE

Methods Decrease Infant Deaths from Diarrhea

► **INFANT** deaths from acute diarrheas have been reduced from 30% to 50% by methods reported by two Argentine doctors at the First Pan American Congress of Pediatrics in Washington. The doctors are Mario J. del Carril and A. E. Largaia of Buenos Aires.

First step in their treatment is to give plasma to combat shock, and sugar and salt solutions to restore fluid to the dehydrated tissues of the baby. Next they give sulfa drugs or penicillin to fight infection. After these measures, "well chosen feedings," preferably of human milk, are given. Abundant vitamins and whole liver extract are also given.

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Sulfur mining in the United States follows a process patented nearly 60 years ago; essentially it consists of pumping superheated water down a drilled hole to melt the sulfur, then pumping the sulfur-laden water out.

Do You Know?

Dark, close-grained stone called *basalt* makes good ballast for railroads.

Canned *milk*, once opened, should be kept covered and cool, just as fresh milk should be.

Molasses is a common preservative used in farm silos for corn and other forage crops.

The U. S. *Army Corps of Engineers* is older than the Republic; it was established by an act of the Continental Congress on June 16, 1775.

Rooms in modern homes, with low ceilings to save cost, appear higher when sidewalls and overhead are finished with a high reflection paint.

Panama *honey-creepers* are beautiful, small, deep-blue birds that cling tightly to the stems of plants while they sip nectar from the flowers.

The *otter*, whose fur is highly prized, is an unusually large member of the weasel family; its webbed feet are better adapted for swimming than for travel on dry land.

Dropping a *fumigant* by a machine ahead of a plow has been found a successful method of controlling wireworm in the soil; ethylene dibromide solution is one effective substance used.

Brass fixtures in houses, after being cleaned in preparation for a coating of lacquer or other material, must not be touched with the hands; even a slight touch may leave a trace of oiliness from the pores of the skin.

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PHYSICS-ASTRONOMY

Projectiles for Research

► TWO WARTIME inventions, the long-distance rocket and the bazooka-type high-explosive charge, are being combined to hurl artificial meteors into outer space for purposes of pure research in physics and astronomy. Dr. F. Zwicky, professor of astrophysics at the California Institute of Technology, tells of the experiments in *Army Ordnance* (July-August).

The idea is to mount a shaped charge, with a metal lining in its conical cavity, on a super-rocket that will climb above practically all of the earth's atmosphere before the charge is fired. The metal lining will be converted by the intense explosion into one or more projectiles with velocities as great as 50,000 feet per second. This is about 20 times the muzzle velocity of a military rifle bullet.

These super-projectiles will be used as objects of research, such as bombarding the moon. The flashes resulting from their impact will be spectrographically analyzed, to find out what the moon is made of. Further refinements, and bigger rockets and charges, may make it possible to bombard still more distant targets, such as the other planets.

BALLISTICS

To Build Better Rockets

► RESEARCH which may provide a basis for coping with the air-friction heating of surfaces of supersonic missiles and planes, one of the factors placing a ceiling on speeds which can be achieved in sustained supersonic flight, is now under way at the University of California.

Engineers are beginning work with a verification of German research for the V-2 rocket. This research, while it fitted the needs of the V-2, was only a beginning in a field of growing importance, according to H. A. Johnson, engineer in charge of the Army Air Forces-sponsored project.

Present studies are being made in a small, subsonic wind tunnel, using flat plate models of metal and bakelite, to which are attached thermo-couples giving an extremely sensitive reading. Given the same conditions, the heat flow rates at supersonic speeds can be calculated from subsonic results. Next year the engineers hope to study air friction heat-

ing in a supersonic tunnel. Another use of rockets suggested by Dr. Zwicky is the carrying of small photographic telescopes outside the earth's atmosphere. In this way it will be possible to obtain information about radiations from the sun and from more distant stars which is denied to observers on the ground with even the largest telescopes because the atmosphere absorbs a large part of all radiations. He mentions particularly a class of stars with temperatures higher than 100,000 degrees absolute. At present we know practically nothing about them because their radiations consist almost entirely of short-wave ultraviolet, which the atmosphere stops before it reaches the earth's surface.

Astronomical telescopes of the Schmidt type are proving more useful and accurate than radar in tracking rockets fired in the White Sands experiments, Dr. Zwicky states. They follow the rockets by the glow of their white-hot graphite rudders. They also have been used in recording the trajectories of metal particles hurled out by shaped charges in experiments on the ground.

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ing in a supersonic tunnel.

At the present time, Mr. Johnson explained, air travel above 600 miles per hour at sea level is not practical because the uncomfortable temperature of 120 degrees Fahrenheit is generated in the aluminum skin of an airplane. At 1,200 miles per hour at sea level a temperature of 200 degrees Fahrenheit would be generated, and this is about the limit of safety for metals now in use. With greater temperatures and stresses set up by sustained high speed travel, aluminum would tend to break up.

Change in temperature of the air at different altitudes is a factor in the research. At sea level the air temperature is 60 degrees Fahrenheit, while at 100 miles it appears to be about 570 degrees with a variation down to 70 degrees below zero at 35,000 feet. Thus the heat generated on the skin of a plane or missile would be influenced by the belt of air in which it traveled.

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PHARMACY

Better Drugs Foreseen

► **NEW DRUGS** that will outclass penicillin, streptomycin, the sulfa drugs and the war-born antimalarials will be developed by pharmaceutical science and industry, John S. Zinsser, president of the American Drug Manufacturers Association, predicts.

Mr. Zinsser, a chemist by training and president of Sharp and Dohme, one of the member companies of the association, spoke as the guest of Watson Davis, director of Science Service, on Adventures in Science over the Columbia Broadcasting System.

"Scientific knowledge grows by geometric progression," Mr. Zinsser said, explaining that he based his predictions of better drugs to come on the basis of the great developments in the war and prewar years.

Seed of Medical Advances

While it is the doctor who is in the front line in our every day fight against disease, the pharmaceutical industry provides him with the ammunition, the material, the tools and often even the "seed and seed money that start great new medical advances on their way to full flower," he pointed out.

The layman who is sick is told by his doctor what medicine to take and gets the prescription for it filled at the drug store. The many steps before that can be done were described by Mr. Zinsser as follows:

"The pharmaceutical industry bridges the wide gap between the purely laboratory scientist—be he physician, chemist, bacteriologist or pharmacologist—and the practicing physician at the bedside. Very often chemists, pharmacologists and other scientists must do vast amounts of laboratory work before a drug is even

ready for clinical testing by the doctor.

"After tests have proven a drug's merit, our chemical engineers must make the jump from a pilot plant to full commercial production. And then our control chemists must guard the identity, purity, quality and strength of the drug as it moves from our plant through the wholesaler, to the pharmacist and ultimately to the patient.

"Actually, those not familiar with our industry often fail to realize the vast amount of research work in which our chemical engineers and control chemists constantly are engaged. There is little point in discovering an important new drug if our engineers can't produce it on a commercial scale. And sometimes it may be just as important to find a more precise test for the potency of a drug as it is to find a new one.

"The pharmaceutical industry contributes heavily to some phases of research and entirely supports other phases. We make our grants to colleges, universities, research organizations and hospitals engaged in pure research. We underwrite research in our own laboratories. Very often we pay the full cost of clinical testing, developmental and control work. For a variety of reasons, by and large, our pharmaceutical companies are somewhat modest about divulging the extent of their contributions to scientific research in all of its phases.

Industry's Contribution

"However, a combination of unusual circumstances, including the last vestiges of wartime controls, has made public at least part of the industry's research bill on streptomycin, one of the new germ-killing chemicals from mold. We know that 11 pharmaceutical companies contributed over \$1,000,000 in less than a year to the basic clinical evaluation of this drug. This was done by grants to a National Research Council committee under the direction of Dr. Chester Keefer, of Boston.

"After this program was finished, a similar group pledged themselves to spend another \$1,000,000 in six months to determine the value of this drug as a treatment for tuberculosis—a project supervised by the Trudeau Society, the medical arm of the National Tuberculosis Association. This \$2,000,000 clinical budget for 18 months doesn't include the money spent for other types

of research necessary to bring this drug from Dr. Waksman's test-tube to the patient's bedside. The drug is relatively hard to make—developmental research has already paid off in increased yields and reduced prices. Control chemists had to start almost from scratch to work out precise new tests for this 'miracle drug'."

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INVENTION

Wire Fire Alarm Cable

► **WHAT MIGHT** be called a wire fire watchman, a cable that can be strung anywhere to sound the alarm when a fire starts, is the subject of patent 2,423,537, granted to D. R. Wheeler of Shreveport, La. Around a central wire is wound a ribbon-like layer of insulating material, with many perforations. Outside this is a sleeve of easily fusible metal, and finally an outer insulating layer. When a fire starts, the fusible metal melts and runs through the perforations of the inner insulation, thus completing the alarm circuit.

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The first sign of *rabies* in a dog is a change of disposition; friendly dogs lose their friendliness, and sometimes dogs that were formerly aloof become affectionate and gentle.

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Attack Ragweed Now!

➤ 2,4-D WAS ONE of a thousand or so chemical compounds on which experiments were conducted during the war, with the idea of ruining enemy crops by spraying them with it, from low-swooping airplanes. Hostilities ended before this particular kind of biological warfare could be put into practice.

Because it had been discovered that 2,4-D kills broadleaved plants but does little harm to most kinds of grass, it was first touted as a lawn-weed eradicator. It does very well at that, too. Then its virtues as a slayer of massed weed patches began to be discovered, and it is being used this season in combating poison ivy, Jap honeysuckle and similar pests.

Last season enough tests were made on the ragweeds with it to show its great usefulness in subduing these causes of most of American hayfever sneezes to demonstrate its practicability in this field of weed combat also. It has been put to

large-scale use this season, and should be in every place where ragweed or other hayfever pests grow.

Foresighted city fathers who 2,4-D'd their ragweed patches a month ago were able to save a good many dollars, for when the weeds are young they will succumb to very dilute solutions. Now that the weeds have grown tall and tough-leaved a stronger solution will be required—the regular one-to-a-thousand formula that is considered strong enough medicine for practically all weeds. This may not kill all the ragweed outright, but it will prevent it from coming into bloom and shedding pollen; which of course is the important thing.

No time is to be lost now. Both tall and low ragweeds come into bloom early in August in our northernmost states, and the wave of pollen-shedding (and sneezing) rolls southward, reaching the Gulf states after early frosts have checked ragweed growth in the North.

This is an especially opportune year for an all-out attack on ragweed growth in communities that recently had their troubles with high water. Low-lying land in railroad yards and "the bottoms" generally, which is normally a great place for tall ragweed, has had its weed crops pretty well drowned, leaving only the upland areas to be mopped up by the sprayer crews.

Science News Letter, July 19, 1947

PHYSICS

"Seeing Eye" Fuze Used On Rockets During War

➤ A "SEEING EYE" fuze, that operated on daylight instead of the radio waves of the proximity fuze, was used on rockets during the war, it is now disclosed. This optical proximity fuze is described in detail by Frank A. Zupa of the Bell Telephone Laboratories, *Army Ordnance* (July-Aug.).

Essential parts of the device were a ring-shaped lens built into its nose, a photocell, an amplifier and a selective switch. When the rocket was fired, the selective switch armed the fuze by throwing the amplifier into circuit.

While the rocket was in flight, daylight entering through the lens and striking the photocell maintained a certain level of current that did not activate the detonating mechanism. As the missile approached its target, however, some of the light was cut off by the target itself, and the resulting change in current level served to set off the explosive charge.

Science News Letter, July 19, 1947

MEDICINE

Pyribenzamine Ointment Relieves Itching Skin

➤ ITCHING SKIN can be relieved in most patients by an ointment containing one of the new hayfever remedies, Drs. Samuel M. Feinberg and Theodore B. Bernstein, of Northwestern University Medical School, report in the *Journal of the American Medical Association* (July 5).

Pyribenzamine is the chemical they used on some 50 patients. Other of the new anti-hayfever remedies might be equally useful in ointment form, they state. None of these chemicals, including pyribenzamine, is a cure for hayfever, but they give relief of symptoms to some.

Eczema was the cause of the itching in 33 of the patients treated with the new ointment. The itching was consistently relieved in 24 of them. Some had more relief from the pyribenzamine ointment than they had had from anything they had used on their skins, including local anesthetics.

Eight of nine patients with another kind of itching, technically known as pruritus ani, were also relieved by the ointment.

The ointment does not cure the underlying condition, which may or may not be an allergy, but it does relieve the itching which is often the most distressing symptom and in some cases the skin inflammation improves.

The idea of using pyribenzamine in an ointment for relief of itching came from finding that when given by mouth it greatly relieved the itching of hives due to allergy. Before having the chemical put into an ointment, the Chicago doctors soaked cotton in a solution of the chemical and tried that. This gave relief of an itching nose and upper lip which was the only unrelieved symptom of a patient they had been treating for ragweed-caused hayfever for years.

Science News Letter, July 19, 1947

CHEMISTRY

Wetproof Paper Process

➤ WETPROOF PAPER, impervious to most oils as well, is made by a process on which patent 2,423,555 has been issued to C. D. Ender of Wilmington, Del., assignor to the Hercules Powder Company. Chlorinated rubber is the principal ingredient applied to the paper as it is run through the machine in a continuous web.

Science News Letter, July 19, 1947

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Books of the Week

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DENTAL CARIES—Bernard Gottlieb—*Lea and Febiger*, 262 p., illus., \$10. A thorough discussion of the pathology of dental caries, with excellent photomicrographs.

ELECTRO-PLATING—Samuel Field and A. Dudley Weill—*Pitman*, 5th ed., 483 p., illus., \$5. A survey of modern practice in electrodeposition including the analysis of plating solutions.

ESSENTIALS OF APPLIED PHYSICS—Royal M. Frye—*Prentice-Hall*, 322 p., illus., \$4.35. A textbook for a concise course which must cover topics not ordinarily found in a preparatory course. The latest concepts in physics are discussed; an appendix explains the minimum of mathematics necessary for a clear understanding of physics.

FOOD REGULATION AND COMPLIANCE—Arthur D. Herrick—*Revere*, Vol. II, 655 p., \$10. This volume discusses fully the subject of food adulteration under the law, administrative proceedings and enforcement and defense actions.

HOME-BUILT PHOTO EQUIPMENT—Walter E. Burton—*Ziff-Davis*, Little Technical Library, 196 p., illus., 95 cents. Practical suggestion of things to make and how to make them.

HUMAN BREEDING AND SURVIVAL—Guy Irving Burch and Elmer Pendell—*Penguin*, 138 p., 25 cents. A discussion of the field of population cause and effect and its ultimate effect on world peace.

INORGANIC SYNTHESIS Vol II—W. Conrad Fernlius, ed.—*McGraw-Hill*, 293 p., \$4. Giving detailed and tested methods for the synthesis of inorganic substances, this

volume has an index which is cumulative for Vol. I. Chapters are numbered according to the groupings in the Mendeleev periodic table and an appendix on nomenclature is included.

THE METAPHYSICAL SOCIETY: Victorian Minds in Crisis 1869-1880—Alan Willard Brown—*Columbia Univ.*, 372 p., \$4.50. This history of a little-known and vaguely understood society includes a study of the conflicts between religion and science in that period.

NURSE-PATIENT RELATIONSHIPS IN PSYCHIATRY—Helena Willis Render—*McGraw-Hill*, 346 p., \$3. Approached from the point of view of human relationships, this text gives an understanding of the psychiatric aspects of nursing care.

PHENOPLASTS: Their Structure, Properties, and Chemical Technology, High Polymers, Vol. VII—T. S. Carswell—*Interscience*, 267 p., illus., \$5.50. A compilation from the literature of the past 10 years on the theories and findings concerning the techniques of working with the phenoplasts and their chemical and physical properties.

RADIO QUESTIONS AND ANSWERS—Editors of *Radio-Craft*—*Radcraft*, No. 31, 64 p., illus., paper, 50 cents.

STYLE RULE—S. Stephenson Smith—*Wordsmith*, 23 p., spiral, \$1. A ready-reference handbook for writers, students, stenographers and all who write, covering grammar, sentence rhetoric, word usage, punctuation, uses of sources, and copy editing.

Science News Letter, July 19, 1947

times greater than that of the facilities being replaced.

Science News Letter, July 19, 1947

CHEMISTRY

New Insulant Gives More Room in Refrigerators

➤ **MORE ROOM** in refrigerators is becoming possible because a new insulating material permits thinner walls without loss of efficiency. The new insulant might be described as sand filled with air bubbles. Actually it consists of six per cent silica and 94% air.

It is made by treating sodium silicate with sulfuric acid. This makes a jelly consisting of a microscopically foam-like mesh of silica walls imprisoning droplets of water. The water is removed by heat and pressure, leaving only the silica cells filled with air. This kind of a structure is practically ideal from the heat-insulation viewpoint.

The new product was originated by Dr. S. S. Kistler of the University of Illinois, and will be manufactured by the Monsanto Chemical Company under the trade-name Santocel.

Science News Letter, July 19, 1947

to smooth the way for DIABETICS



"Diabetic Care in Pictures" was designed to smooth the way so that diabetes and its treatment might be completely understood. The result of more than 25 years of questioning in a nationally-known clinic—and the tested answer to all those questions. Simply written and lavishly illustrated by charts, photographs and drawings, it tells about the diet, measurement and injection of insulin, insulin reactions, acidosis and diabetic coma, blood and urine tests and necessary body care. The coupon below will bring a copy immediately.

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TELEGRAPHY

Automatic Relay System

➤ **FUTURE** telegrams from surrounding areas passing through the Western Union central station in Philadelphia for transmission to distant points will encounter no delay, thanks to a new push-button system cut into the service recently.

This Philadelphia center will serve all telegrams to and from Pennsylvania, New Jersey and the area east of the Delaware river. By merely pressing buttons, telegrams will be automatically transmitted to their destinations.

In the system being replaced, telegrams received are rushed from receiving instruments to sending keyboards by messengers on roller skates. At the typewriter-like keyboards, the messages are put on the wire.

With the new installation, each message will be typed only once. That will be at its point of origin. It will be received in the Philadelphia relaying sta-

tion by a telegraph device known as a printer perforator, which simultaneously prints the message and punches combinations of holes in a paper tape.

In the central office, a clerk will read the destination on the tape as the message begins to come in. He then quickly presses a button bearing the name of the destination. The pressing of the button will cause the perforated tape to run through an automatic transmitter which will flash the electric signals to the desired terminal. There the signals will be automatically received in printed form ready for delivery.

There will be other high-speed centers at St. Louis, Richmond, Atlanta, Dallas and Oakland, Calif. The entire \$2,000,000 installation in Philadelphia, one circuit of which is now ready for use, will be ready for other circuits within a few weeks. The system gives a capacity three

• New Machines And Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 371. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **ALUMINUM** storm windows and doors are strong, light-weight, trim and neat in appearance, and cut out little light because of the narrow frame. The door is the combination type in which the glass panels can be replaced quickly with insect screens. Windows can be removed easily for cleaning.

Science News Letter, July 19, 1947

✿ **TRI-VISION LENS** for three-dimensional photography has been perfected and has been delivered to the U. S. Navy for trial. It is eight inches in diameter. Photographs taken with it give an astonishing sense of depth without the use of stereoscopic spectacles. It uses range from portraits to motion pictures.

Science News Letter, July 19, 1947

✿ **SUPER ROCKETS** will travel faster and more accurately when equipped with a new ball-and-needle bearing device which generates a swirling flow of discharge gases. The propellant gases, detonated in a small chamber, push out through slanted jet openings to cause the rocket to spin as it travels.

Science News Letter, July 19, 1947

✿ **INDEXING DEVICE** for record



cards of standard or special sizes, holds them on a plastic revolving spool as shown in the picture. It requires no more space on an office desk than ordinary telephone. Cards are quickly inserted or removed; two faces are visible at the same time.

Science News Letter, July 19, 1947

✿ **MOBILE SPRAYER** for dispersing insecticides is designed for attachment to almost any vehicle having a gasoline engine, using the exhaust to supply spraying pressure. A tank attached to the vehicle holds the spraying solution; a flexible hose runs from it to receive the exhaust gases, then to the nozzle.

Science News Letter, July 19, 1947

✿ **WALL ELECTRIC CLOCK**, with a 14-inch-wide dial, has an electrosetting mechanism which makes resetting easy and accurate. After current interruptions, pulling a small ring at the bottom of the clock speeds up the minute hand to 300 times its ordinary rate. The hand is moved forward one hour in 12 seconds.

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Question Box

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Where published sources are used they are cited.

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